



**Ben-Gurion University of the Negev**  
**Jacob Blaustein Institutes for Desert Research**  
The Swiss Institute for Dryland Environmental and Energy Research  
**Mitrani Department of Desert Ecology**

## Seminar

### **Nir Sapir**

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and Environmental Biology,  
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Moulting Striolated bunting (*Emberiza striolata*).  
Photo credit: Yosef Kiat

Tuesday, March 6, 2018, 12:00

Seminar Room, Old Administration Building

Participants are invited to meet the seminar speaker at the MDDE meeting room immediately after the seminar (~ 13:00). Please bring your lunch; snacks will be provided.

## **Causes, Patterns and Consequences of Wing Morphological Deficits in Birds: Bio-Mechanical, Ecological and Evolutionary Aspects**

Wings serve as the main surface over which aerodynamic forces may act on a flying organism, increasing the animal's lift to drag ratio and enabling the animal to perform different flight-related tasks throughout its life. Morphological deficits to the wings may thus negatively influence different flight properties and consequently reduce fitness. The significance of wing area degradation for flight performance throughout the animal's life cycle is nevertheless still unclear. Using force and flow measurements of a 3D printed model of hummingbird wings, I will describe possible consequences of hummingbird wing feather moult. Then I will further describe several adaptations that have been evolved by passerines to reduce detrimental consequences of wing morphological deficits during moult. These include bird flight habits, as well as time pressure for shortening moult duration due to breeding in high latitudes and long-distance migrating. Lastly, I will describe the consequences of wingtip ablation in Anna's hummingbirds (*Calypte anna*) that were studied under different airspeeds within a wind-tunnel. Measurements of flight metabolic rates, wingbeat kinematics and wingtip circulation under control and wing-tip ablation treatments will be presented. My empirical findings enhance the understanding of the causes, patterns and consequences of wing morphological deficits in birds.